

# ENVELOPE COMPONENT METHOD

# ENV-2

PROJECT NAME

DATE

## WINDOW AREA CALCULATION and SKYLIGHT AREA CALCULATION

GROSS WALL AREA (GWA)		DISPLAY PERIMETER (DP)	
GWA x 0.40		DP x 6	

GREATER OF

If the PROPOSED WINDOW AREA is greater than the MAXIMUM ALLOWABLE WINDOW AREA, go to another method.

MAX. ALLOWABLE WINDOW AREA

PROPOSED WINDOW AREA

Window Wall Ratio = Proposed Window Area Divided by Gross Exterior Wall Area

ATRIUM HEIGHT

FT

IF ≤ 55 FT

IF > 55 FT

0.10

X

=

0.05

X

=

GROSS ROOF AREA

ALLOWED AREA

If the ACTUAL SKYLIGHT AREA is greater than the ALLOWED SKYLIGHT AREA, go to another method.

ACTUAL SKY. AREA

## OPAQUE SURFACES

					ASSEMBLY U-FACTOR*			
					PROPOSED	TABLE VALUES?		MAXIMUM ALLOWED
						Y	N	
ASSEMBLY NAME (eg. Wall-1, Floor-1)	TYPE (eg. Roof, Wall, Floor)	HEAT CAPACITY	INSULATION R-VALUE*					
			PROPOSED	MINIMUM ALLOWED				
						<input type="checkbox"/>	<input type="checkbox"/>	
						<input type="checkbox"/>	<input type="checkbox"/>	
						<input type="checkbox"/>	<input type="checkbox"/>	
						<input type="checkbox"/>	<input type="checkbox"/>	
						<input type="checkbox"/>	<input type="checkbox"/>	

\* For each assembly type, meet the minimum insulation R-value or the maximum assembly U-factor.

## WINDOWS

WINDOW NAME (e.g., Window-1, Window-2)	ORIENTATION				U-FACTOR		# OF PANES	PROPOSED RSHG					PROP. RSHG	ALLOWED RSHG
	N	E	S	W	PROP.	ALLOW.		SHGC						
									H	V	H/V	OHF		
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										

## SKYLIGHTS

SKYLIGHT NAME (e.g., Sky-1, Sky-2)	GLAZING			# OF PANES	U-FACTOR		SOLAR HEAT GAIN COEFFICIENT	
	With Curb	With No Curb	Plastic		PROPOSED	ALLOWED	PROPOSED	ALLOWED
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					

# OVERALL ENVELOPE METHOD

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## WINDOW AREA TEST

A. DISPLAY PERIMETER  FT  $\times 6 =$   SF DISPLAY AREA

B. GROSS EXTERIOR WALL AREA  SF  $\times 0.40 =$   SF 40% AREA

C. GROSS EXTERIOR WALL AREA  SF  $\times 0.10 =$   SF MINIMUM STANDARD AREA

D. ENTER LARGER OF A OR B  SF MAXIMUM STANDARD AREA

E. ENTER PROPOSED WINDOW AREA  SF PROPOSED AREA

F. WINDOW WALL RATIO = Proposed Window Area Divided by Gross Exterior Wall Area =

IF E IS GREATER THAN D OR LESS THAN C, PROCEED TO THE NEXT CALCULATION FOR WINDOW AREA ADJUSTMENT. IF NOT, GO TO PART 2 OF 6.

1. IF E IS GREATER THAN D:

MAXIMUM STANDARD AREA   $\div$  PROPOSED WINDOW AREA  = WINDOW ADJUSTMENT FACTOR

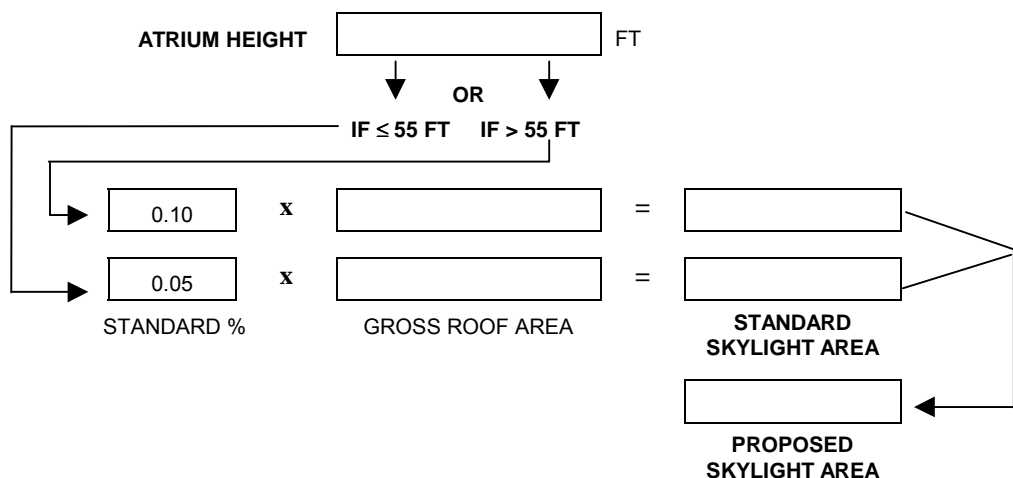
GO TO PART 6 TO CALCULATE ADJUSTED AREA

2. IF LESS THAN C:

MINIMUM STANDARD AREA   $\div$  PROPOSED WINDOW AREA (IF E = 0 ENTER 1)  = WINDOW ADJUSTMENT FACTOR

GO TO PART 6 TO CALCULATE ADJUSTED AREA

## SKYLIGHT AREA TEST



IF THE PROPOSED SKYLIGHT AREA IS GREATER THAN THE STANDARD SKYLIGHT AREA, PROCEED TO THE NEXT CALCULATION FOR THE SKYLIGHT AREA ADJUSTMENT. IF NOT, GO TO PART 2 OF 6.

1. IF PROPOSED SKYLIGHT AREA  $\geq$  STANDARD SKYLIGHT AREA:

STANDARD SKYLIGHT AREA   $\div$  PROPOSED SKYLIGHT AREA (IF E = 0 ENTER 1)  = SKYLIGHT ADJUSTMENT FACTOR

GO TO PART 6 TO CALCULATE ADJUSTED AREAS

# OVERALL ENVELOPE METHOD

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## OVERALL HEAT LOSS

A		B	C	D	E		F	G	H	
ASSEMBLY NAME (e.g. Wall-1, Floor-1)		PROPOSED					STANDARD			
		AREA	HEAT CAPACITY	U-FACTOR	TABLE VALUES?		UA (B × D)	AREA* (Adjusted)	U-FACTOR	UA (F × G)
					Y	N				
WALLS					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
ROOFS/CEILINGS					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
FLOORS/SOFFITS					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>	<input type="checkbox"/>				
WINDOWS			N/A		<input type="checkbox"/>	<input type="checkbox"/>				
			N/A		<input type="checkbox"/>	<input type="checkbox"/>				
			N/A		<input type="checkbox"/>	<input type="checkbox"/>				
			N/A		<input type="checkbox"/>	<input type="checkbox"/>				
			N/A		<input type="checkbox"/>	<input type="checkbox"/>				
			N/A		<input type="checkbox"/>	<input type="checkbox"/>				
SKYLIGHTS			N/A		<input type="checkbox"/>	<input type="checkbox"/>				
			N/A		<input type="checkbox"/>	<input type="checkbox"/>				
			N/A		<input type="checkbox"/>	<input type="checkbox"/>				
			N/A		<input type="checkbox"/>	<input type="checkbox"/>				
			N/A		<input type="checkbox"/>	<input type="checkbox"/>				
			N/A		<input type="checkbox"/>	<input type="checkbox"/>				

\* If Window and/or Skylight Area Adjustment is Required, use adjusted areas from part 6 of 6.

	Column E shall be no greater than column H	
TOTAL		TOTAL

# OVERALL ENVELOPE METHOD

(Part 3 of 6)

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## OVERALL HEAT GAIN FROM CONDUCTION

A		B	C	D	E	F		G	H	I	J	
ASSEMBLY NAME (e.g. Wall-1, Floor-1)		PROPOSED						STANDARD				
		AREA	TEMP. FACTOR	HEAT CAPACITY	U-FACTOR	TABLE VALUES?		HEAT GAIN (B x C x E)	AREA* (Adjusted)	U-FACTOR	TEMP. FACTOR	HEAT GAIN (G x H x I)
						Y	N					
WALLS						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
ROOFS/CEILINGS						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
FLOORS/SOFFITS						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
						<input type="checkbox"/>	<input type="checkbox"/>					
WINDOWS			N/A			<input type="checkbox"/>	<input type="checkbox"/>					
			N/A			<input type="checkbox"/>	<input type="checkbox"/>					
			N/A			<input type="checkbox"/>	<input type="checkbox"/>					
			N/A			<input type="checkbox"/>	<input type="checkbox"/>					
			N/A			<input type="checkbox"/>	<input type="checkbox"/>					
			N/A			<input type="checkbox"/>	<input type="checkbox"/>					
SKYLIGHTS			N/A			<input type="checkbox"/>	<input type="checkbox"/>					
			N/A			<input type="checkbox"/>	<input type="checkbox"/>					
			N/A			<input type="checkbox"/>	<input type="checkbox"/>					
			N/A			<input type="checkbox"/>	<input type="checkbox"/>					
			N/A			<input type="checkbox"/>	<input type="checkbox"/>					
			N/A			<input type="checkbox"/>	<input type="checkbox"/>					

\* If Window and/or Skylight Area Adjustment is Required, use adjusted areas from part 6 of 6.

SUBTOTAL

SUBTOTAL



# OVERALL ENVELOPE METHOD

(Part 5 of 6)

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## OVERALL HEAT GAIN FROM RADIATION

## FENESTRATION SURFACES

	A	B	C	D	E	F	G	H	I	J	K	L	M
	WINDOW/SKYLIGHT NAME (e.g Window-1, Sky-1)	WEIGHTING FACTOR	PROPOSED							STANDARD			
AREA			SOLAR FACTOR	SHGC	OVERHANG				HEAT GAIN (BxCx DxExH)	AREA (Adjusted)*	RSHG or SHGC**	SOLAR FACTOR	HEAT GAIN (BxJxKxL)
					H	V	H/V	OHF					
NORTH													
EAST													
SOUTH													
WEST													
SKYLIGHTS						N/A	N/A	N/A	N/A				
						N/A	N/A	N/A	N/A				
						N/A	N/A	N/A	N/A				
						N/A	N/A	N/A	N/A				
						N/A	N/A	N/A	N/A				
* If Window and/or Skylight Area Adjustment is Required, use adjusted areas from part 6 of 6.						Part 3 Subtotal				Part 3 Subtotal			
						Part 4 Subtotal				Part 4 Subtotal			
						Part 5 Subtotal				Part 5 Subtotal			
						TOTAL				TOTAL			
** Only SHGC is used for Skylights  Column I must be less than column M													

# OVERALL ENVELOPE METHOD

(Part 6 of 6)

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## WINDOW AREA ADJUSTMENT CALCULATIONS

☐ CHECK IF NOT APPLICABLE (see Part 1 of 6)

A					B	C	D	E	F	G
WALL NAME (e.g. Wall-1, Wall-2)	ORIENTATION				GROSS AREA	DOOR AREA	WINDOW AREA	WINDOW ADJUSTMENT FACTOR (From Part 1)	ADJUSTED WINDOW AREA (D×E)	ADJUSTED WALL AREA B-(F+C)
	N	E	S	W						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						

TOTALS:

## SKYLIGHT AREA ADJUSTMENT CALCULATIONS

☐ CHECK IF NOT APPLICABLE (see Part 1 of 6)

A	B	C	D	E	F
ROOF NAME (e.g. Roof-1, Roof-2)	GROSS AREA	SKYLIGHT AREA	SKYLIGHT ADJUSTMENT FACTOR (From Part 1)	ADJUSTED SKYLIGHT AREA (C×D)	ADJUSTED ROOF AREA (B - E)

TOTALS: